ORIGINAL FILE

RECEIVED
MAY 26 1988
Federal Communications Commission
Office of the Secretary

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Advanced Television Systems and Their Impact on the Existing Television Broadcast Service	)	MM Docket No. 87-268 RM-5811

MST'S MOTION TO FILE SUPPLEMENTAL INFORMATION

The Association of Maximum Service Telecasters ("MST") hereby requests the Commission to accept the attached study by the Committee for the North American HDTV Demonstrations to the Public: "An Overview of the Survey Results," published in April 1988 ("North American Study"). This study was not available to MST during the pleading cycle in this proceeding and hence the need to request leave to submit it for inclusion in the record.

The Land Mobile Communications Council ("LMCC") has submitted a similar study, conducted by MIT and first made available in April of this year (the "MIT Study"), for inclusion in the record of this proceeding. LMCC Motion to File Supplemental Information (May 5, 1988). LMCC asserts that the MIT Study shows that the differences between HDTV and NTSC are "minuscule" and urges that "[i]n light of these findings . . . no further delay in implementation" of the Commission's proposals to reallocate UHF spectrum to land mobile radio is warranted. LMCC Motion at 3.

MST disagrees with the inferences LMCC draws from the study. For these purposes, it is necessary to note only that 1) the study expressly disclaims that its data provide a conclusive basis for assessing how the perceived differences between NTSC and HDTV ultimately will translate into market performance[1/] and 2) the MIT Study is but one non-definitive study, and one which has not yet been subjected to full scientific evaluation, criticism and replication.[2/] It is simply wrong to suggest that this study provides an adequate basis for the FCC to now proceed to authorize land mobile "sharing" of the UHF television spectrum.

In any event, MST offers to the Commission the North American Study, which was also released last April. The North American Study sampled almost 7000 interested observers from the general public and from special-interest groups in five locations in the United States and Canada (Ottawa, Toronto, Montreal, Seattle, Washington, and Danbury, Connecticut). The study used the Japanese MUSE-E high-definition television system. It focused on three specific

---

1/ "These data do not indicate that there is no market for HDTV. Nothing of the sort." MIT Study at 11.

2/ "The research reported here is suggestive but not conclusive. The findings will require both replication and elaboration. There is much yet to be learned . . . ." MIT Study at 12.

issues: (1) the extent to which viewers perceive and appreciate the differences between HDTV and conventional television; (2) the features of the two systems that accounted for the differences perceived; and (3) the implications of the perceived differences for future consumer behavior. (The methodology is detailed in the attached summary.)

The North American Study concluded that viewer preference for HDTV over conventional television is significant. Viewers tended to rate the difference between the two systems as "considerable" or "great." In addition, the study concluded that viewers' reactions were strongly related to judgments of sharpness, color quality and depth portrayal -- attributes important in the assessment of HDTV. Finally, the study recommended further research.

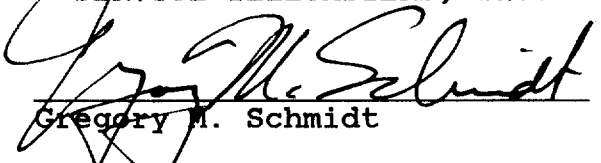
MST takes no position at this point on the absolute or relative merits of either of these studies or the ultimate significance of their findings. It offers the North American Study only as evidence that even in the realm of published non-proprietary research there appears to be a range of data developing. (Needless to say, millions of dollars of proprietary research has also been conducted by HDTV system developers and it has been sufficiently encouraging that those developers have invested hundreds of millions of dollars in the development of this new technology.)

MST agrees with the two studies that much more needs to be accomplished in the area of subjective testing. The Advanced Television Test Center, of which MST is a part along with NAB, INTV, PBS and the three commercial networks, will conduct additional in-depth, comprehensive and objective tests of this nature. The results of these tests will be submitted to the FCC, its Advisory Committee, and the Advanced Television Systems Committee and made available to other interested parties.

MST does not oppose the inclusion of this type of material in the record of this proceeding. MST does object to LMCC's highly selective submission of misleading bits and pieces of the extensive record on ATV now being compiled in the Commission's ATV proceeding. The submission of the North American Study is a small effort to correct one of LMCC's errors of omission. But the submission of this data should not in any way imply that MST believes the record in this proceeding is ripe for further action. An accurate assessment of the true implications of ATV, including the all-important assessment of ATV's likely spectrum needs, must await further progress in the prodigious efforts being extended in the ATV proceeding. Such progress depends on all parties devoting their energies to assisting the Commission in expeditiously compiling a balanced and complete record on which to make this epochal determination.

Respectfully submitted,

ASSOCIATION OF MAXIMUM
SERVICE TELECASTERS, INC.



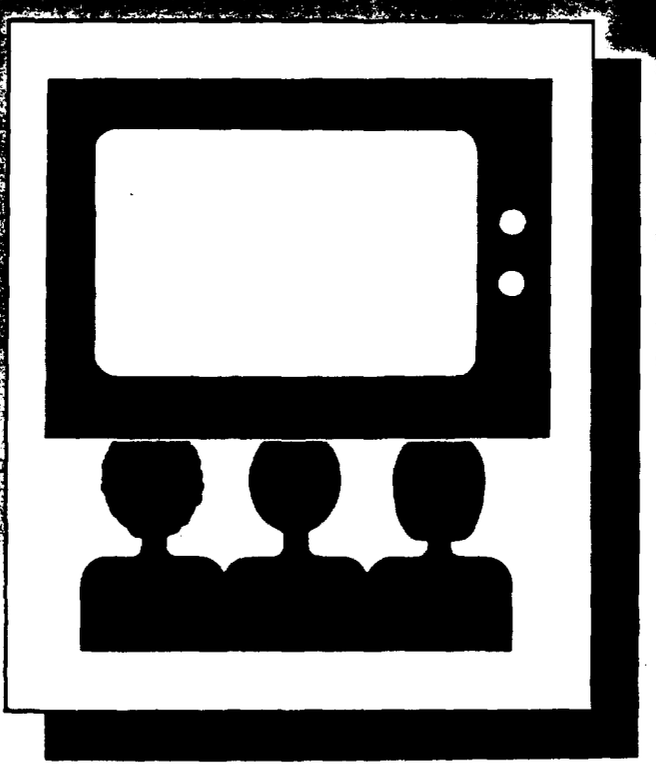
Gregory M. Schmidt

Covington & Burling
1201 Pennsylvania Avenue, N.W.
P.O. Box 7566
Washington, D.C. 20044
202-662-6000

Its Attorneys

May 26, 1988

The North American Public Demonstrations of High Definition Television:



An overview of the survey results.

April 1988

THE NORTH AMERICAN HIGH DEFINITION TELEVISION DEMONSTRATIONS TO THE PUBLIC:

AN OVERVIEW OF THE SURVEY RESULTS

APRIL 1988

MEMBERS OF THE COMMITTEE FOR THE NORTH AMERICAN HIGH DEFINITION TELEVISION DEMONSTRATION TO THE PUBLIC:

NAME	COMPANY
Dr. Metin Akgun	Communications Research Centre
Mr. Gérald Chouinard	Communications Research Centre
Ms. Jacqueline Cook	Telesat Canada
Mr. Kenneth Davies	CBC Engineering
Mr. Michel Durocher	CBC Engineering
Ms. Chris Ehrenbard	Home Box Office Inc.
Mr. David Garforth	CBC Engineering
Mr. Douglas Gray	Telesat Canada
Dr. Paul Hearty	Communications Research Centre
Mr. Paul Heimbach	Home Box Office Inc.
Mr. Ed Horowitz	Home Box Office Inc.
Mr. Allan Levy	Home Box Office Inc.
Mr. Max Melnyk	Department of Communications
Mr. Robert Maxwell	Home Box Office Inc.
Mr. Don Monteith	Cablesystems Engineering
Mr. Alfred Norcott, Jr.	Public Broadcasting Service
Dr. Dorothy Phillips	Communications Research Centre
Mr. Roger Poirier	Canadian Cable Television Association
Dr. Maseo Sugimoto	NHK - Japan Broadcasting Corporation
Mr. André Vincent	Communications Research Centre
Mr. René Voyer	Communications Research Centre
Mr. Don Weese	Telesat Canada
Ms. Janet West-Cyr	CBC Engineering
Ms. Lorraine Wilson	Department of Communications

The demonstrations and survey reported in this document were carried out by the Committee for the North American HDTV Demonstrations to the Public (K.P. Davies, CBC, Chairman).

The participants included:

Canadian Broadcasting Corporation
Canadian Cable Television Association
Department of Communications - Government of Canada
Home Box Office Inc.
Rogers Cablesystems Ltd.
Scarborough Cable Ltd.
Telesat Canada

With the collaboration of:

NHK - The Japan Broadcasting Corporation
BTA - The Broadcasting Technology Association of Japan

The contributions of the following are acknowledged:

CBC Drama
Dolby Laboratories
GE - Americom
Northernlight and Picture Ltd.
RAI - Radiotelevisione Italiana
Rebo High Definition Studio Inc.
Sony Corporation
Telesat Canada

The report was prepared by:

Dr. Stephen J. Lupker and Dr. Natalie J. Allen
University of Western Ontario, London, Ontario, Canada

and

Dr. Paul J. Hearty
Communications Research Centre
Department of Communications
Ottawa, Ontario, Canada

THE NORTH AMERICAN HIGH DEFINITION TELEVISION DEMONSTRATIONS TO THE PUBLIC:

AN OVERVIEW OF THE SURVEY RESULTS

1. PREAMBLE

This report presents an overview of the results of a survey conducted during the North American High Definition Television Demonstrations. Intended only to summarize the major thrusts of the results, this report has been prepared to ensure the earliest release possible of the survey results. Copies of the full report, expected in June 1988, can be requested using the form provided at the end of this document.

The demonstration and survey project was intended neither to test nor to endorse any particular advanced television system. Rather, it was intended to demonstrate, and to gather reaction to, the concept of advanced television. Use of a specific advanced system, of course, constrains the applicability of the survey results. Similarly, use of near studio-quality conventional TV for comparison presupposes future development in broadcast systems. However, certain general observations are warranted and will be considered in the remainder of this report.

The survey described here is the first major survey of public reactions to advanced television systems. Although the results answer definitively some of the questions about advanced television, they inevitably pose other, more specific questions. It remains for further research to fully pursue and to verify the results of the survey.

2. INTRODUCTION

In October 1987, almost 7000 interested observers from the general public and from special interest groups in several cities in North America received their first opportunity to view, and to comment on, advanced television. Although there are various versions of advanced television under development, only one was

sufficiently developed to be used in the demonstrations and survey. In consequence, the Japanese MUSE-E High Definition Television (HDTV) system, provided by the Japanese Broadcasting Corporation (NHK) and the Broadcasting Technology Association of Japan (BTA), was used.

The objectives of the demonstrations were:

1) to provide public demonstrations of advanced television technology in order to raise public awareness and stimulate discussion; and
2) to collect survey data concerning how individuals respond to various features and aspects of advanced television as exemplified by the HDTV system.

The survey was designed to allow examination of three specific issues:

1) to what extent did viewers perceive and appreciate the differences between HDTV and conventional TV? In the survey, viewers were shown reception-quality HDTV and nearly studio-quality NTSC[1], encouraging a conservative comparison of HDTV as it could be received in the home with NTSC of a quality better than that currently typical of home reception;
2) which features of the two systems accounted for the differences perceived; and
3) what are the implications of the differences perceived for future consumer behaviour.

3. METHODS SUMMARY

3.1 Viewing Sites

Survey data were collected from two types of sites [1, 2]. These sites were set up in five locations across North America: Ottawa (and region), Toronto, Montreal, Seattle (Washington), and Danbury (Connecticut). In the first type of site, the goal was mainly to demonstrate HDTV to the public although, during the

---

[1]NTSC - National Television Systems Committee, the standard for the form of TV currently in use in North America.

demonstration, survey results were obtained from almost 4000 respondents. These sites were in shopping centres and used both HDTV and high quality NTSC to present the same programs simultaneously. Typically, viewers could not see both types of TV set at the same time. This situation in some sense resembles that faced by individuals examining different brands of televisions in a retail outlet. That is, these individuals did not have a chance to become engrossed in the ongoing program and, thus, their opinions may reflect more the "first-glance" response to TV quality. This group of viewers is referred to as the SC (i.e., Shopping Centre) group.

The second type of site was set up to resemble living room viewing and to achieve some of the control of viewing conditions typically achieved in TV standards testing. Here, individuals sat in front of the two types of TVs at various distances and angles. The expectation was that the viewers would become involved in the programs and that their reactions would be closer to those when actually viewing a TV at home or, perhaps, at a friend's home prior to a purchase decision. For this group, the two TVs were placed side-by-side at the front of the room and were viewed in an alternating fashion. In the Danbury (Connecticut) site, additional tests were conducted using simultaneous display of material on the two systems [3]. This group of respondents is referred to as the LR (i.e., Living Room) group.

In the LR, three programs were shown: "Oniricon", a production by RAI of Italy; a synopsis of "Chasing Rainbows", a production by CBC and Northernlight and Pictures of Canada; and "Around the World in HDTV", a production by NHK of Japan. For each of the first two programs, the first and third quarters of the program were shown on one TV, while the second and fourth were shown on the other. The third program "Around the World in HDTV", was shown only on HDTV. In the SC, viewers also saw a short section of the movie "Top Gun" (shot in 35 mm film and converted into HDTV) and some short rock videos prepared directly in HDTV format by Rebo of New York.

3.2 Questionnaires

There were two forms of the questionnaire [1]. The first, shorter form was administered to the SC group. The 20 questions in the SC questionnaire were a subset of the 55 questions making up the LR questionnaire. The SC questions were aimed at gaining two types of information, the demographic characteristics of the respondents and their evaluations of HDTV and NTSC. The demographic measures included both the standard items (e.g., sex, age, income, occupation) as well as items intended to provide some measure of the extent to which the respondent tended to purchase technologically advanced equipment. The evaluation measures were aimed at assessing:

a) the extent to which viewers saw a difference between systems;
b) the extent to which viewers preferred one system over the other;
c) the viewers' evaluations of likely pricing; and
d) the viewers' projected purchasing behaviour at various prices.

The LR group completed a longer, 55 item questionnaire in four stages. The first section, involving only demographic questions, was completed before viewing. The second section, involving questions about quality, cost, and purchase interest, was completed after viewing "Oniricon" in the alternating display fashion mentioned above. The third section, involving questions about purchase interest for TV equipment and services under various service-availability scenarios, was completed after viewing "Chasing Rainbows". For most groups, the final section of the questionnaire, which involved further questions about quality and purchase interest, was completed after watching "Around the World in HDTV" on HDTV only. Exceptions were the Danbury (Connecticut) group who watched "Around the World in HDTV" using a variety of monitor setups and presentation/ judgement formats and half of the Ottawa viewers who watched "Around the World in HDTV" on a 50" rear-projection HDTV display.

3.3 Equipment

High quality TV displays were used in all settings [1, 2]. The NTSC sets were 25" models, while the HDTV sets were either

28" or 30" models (with the exception of the 50" rear-projection HDTV used for a special demonstration in Ottawa). Pictures in NTSC were taken from a 1" C-type VTR via a high quality cable modulator and were of much better quality than typically found in home reception. The HDTV picture in Ottawa, Montreal, and Toronto was a direct pickup via satellite from Ottawa using standards of the DBS[2] service. In Seattle, images involved relay by a second satellite. In all cases, a MUSE-E encoder and a MUSE-E decoder were used to send and receive the HDTV image and image quality was consistent with home reception from satellite. In Danbury, the HDTV image was taken from a videotape prepared by recording materials received in Ottawa via the satellite link (with MUSE-E encoding and decoding), resulting in lower image quality than that typical of the other cities which received the direct satellite signal.

3.4 Layout of Sites

In the SC sites, the two televisions were set up side-by-side facing away from each other at an angle such that they could not conveniently be seen simultaneously [1, 2]. Further, barriers were also set up to maintain minimum viewing distances of 3H[3] for HDTV and 4H for NTSC. (These are the minimum viewing distances recommended for the HDTV by the NHK and for the NTSC by the CCIR[4].) Lighting levels around the sets were somewhat high and reports of problems with on-screen reflections were common. The backgrounds were neutral and nonreflectant and an attempt was made to keep them free of all sources of distraction. All brand names on the TVs and other equipment were hidden from the viewers. Audio information came directly from the HDTV signal and, thus, had to be synchronized with the NTSC picture. Sound intensities were kept at moderate levels.

In the LR sites, the two television sets were positioned side-by-side at the front of the room [1, 2]. Seats were positioned in rows at distances of 3H, 5H, 7H and 9H, a range providing both ideal and non-ideal viewing distances for both

---

[2]DBS - Direct Broadcast Satellite.
[3]H - the height of the picture area on the screen
[4]CCIR - International Radio Consultative Committee, an international standards body for television and other broadcast services.

systems. Viewers were instructed to take the seats which were closer to and/or directly in front of the two sets. Of the 28 possible seating positions, 20 had viewing angles of 30 degrees or less, a specification following that suggested by the CCIR for assessments of conventional TV. Lighting and background were carefully controlled. Audio signals generally were drawn from the source generating the picture at any point in time. Again, equipment brand names were hidden from viewers.

3.5 Recruitment of Participants

Respondents were selected in a variety of ways [1]. The 4000 SC participants were simply asked to participate as they walked by the displays. The 2800 LR participants were recruited through radio and newspaper advertisements, through invitation, and through random selection (e.g., from the shopping centre population, from area telephone directories, etc.). In Danbury, only randomly selected viewers were used in LR tests. It has not yet been determined how well the samples represent the overall populations of the two countries involved.

4. SUMMARY OF RESULTS

Preliminary analysis of the results showed good consistency across sites in Ottawa, Montreal, Toronto, and Seattle. These sites form the basis of the reports in this section. The results from the Danbury site, which differed considerably from those in other cities, are discussed in Section 4.2 and in [3, 4].

4.1 Demographic Data

The demographic profiles of the LR and SC sites (excluding Danbury) were somewhat different. In the LR sites, the typical viewer:

a) is male,
b) is approximately 41 years old,
c) has a university degree,
d) has a yearly household income of approximately $53,000 CAN ($40,000 US),
e) has approximately 3.5 video devices (generally, including two televisions and a VCR),

f) has almost 5 nonvideo devices (generally, including a stereo, a microwave and a "walkman"-like device),
g) reports watching approximately 6 hours of television a week, and
h) is as likely as not to work in a television-related industry (broadly defined).

In the SC sites, the typical viewer:

a) is male,
b) is approximately 37 years old,
c) has a high school degree,
d) has a yearly household income of approximately $48,000 CAN,
e) has approximately 4 video devices,
f) has approximately 5 nonvideo devices,
g) reports watching approximately 8 hours of television a week, and
h) does not work in a television-related industry (broadly defined).

Nonetheless, in both types of sites, participants were drawn from a fairly broad cross-section of the population. Thus, it is unlikely that the results were affected by any specific sampling bias.

4.2 Is There a Preference for HDTV?

The answer to this question is a definite yes. In responses to questions asking for direct HDTV-NTSC comparisons, viewers:

a) rated the differences between the two types of sets as between "considerable" and "great";
b) indicated that the HDTV picture quality, in comparison to the NTSC picture quality, was between "slightly better" and "better";
c) said that they "probably would buy" HDTV if it was in their price range, but were "undecided" about NTSC;
d) expected the HDTV set to cost approximately $300-$400 (CAN or US) more than a high quality NTSC set;
e) were more likely to endorse the statement "is better than current TV" for HDTV (70%) than for NTSC (34%); and

f) indicated a stronger willingness to purchase HDTV than NTSC at both $2000 and $3300 CAN ($1500 and $2500 US).

These results were drawn from questions asked of both LR and SC viewers and held for both sets of viewers. The small difference which did exist between groups indicated slightly more preference for HDTV over NTSC among the LR viewers than among the SC viewers, due mainly to the fact that LR viewers tended to be quite critical of NTSC.

A second set of questions assessing preference for HDTV was asked only of the LR viewers. These questions relate to preference for various attributes of the two systems and projected purchasing behaviour under various introduction scenarios. The same basic pattern was obtained. That is, viewers:

a) strongly preferred HDTV on the attributes of colour quality, sense of depth, sharpness, brightness, and shape of the screen;
b) preferred HDTV at least minimally on attributes such as motion quality and appropriateness of size;
c) expressed more purchase interest in HDTV than in NTSC under both introduction scenarios (to be described in Section 4.4); and
d) were willing to pay more to receive pay movies in HDTV than in NTSC.

Overall, the results show that viewers were much more positive toward HDTV than NTSC in both types of sites in four of the five cities. In Danbury, the SC participants preferred HDTV, but did so to a lesser extent than those at the other SC sites. At the Danbury LR site, two types of tests yielded different results. When display alternated between the two TV systems (as at the other LR sites), participants expressed little or no preference for the HDTV system. However, when material was displayed simultaneously on both systems, participants expressed a preference for HDTV, but did so to a somewhat lesser extent than did participants in the alternating tests at the other LR sites.

It is not clear why the two types of tests at the Danbury LR site provided such different results. It is possible that, when

presented with a reduced quality HDTV source and a high quality NTSC source, participants were unable to distinguish the two systems on the basis of brief, alternating displays. Alternatively, it is possible that additional methodological variations between the two types of tests (e.g., degree of prior exposure to the TV systems, use of different program material, elimination of possible order-of-display effects, etc.) were responsible for the different results.

The difference between the results obtained in the Danbury SC and LR (alternating) tests and those obtained in the other SC and LR tests may have resulted from small differences in the composition of viewer samples or in methodology. However, it is likely that the difference resulted primarily from a difference in the quality of the HDTV sources used. That is, while the near studio-quality of the NTSC source was maintained consistently across sites, the quality of the HDTV source was detectably lower in Danbury than elsewhere. Thus, in a conservative test in which HDTV is compared with near studio-quality NTSC, HDTV gives up much of its advantage if taken from a lower quality source. The latter observation suggests that quality of reception is a critical issue for HDTV.

Although the present results do show that viewers much prefer HDTV, they also suggest that viewers do not expect to pay substantially more for HDTV (approximately $300-$400 CAN or US). Thus, rates of responding "probably would" or "definitely would" buy HDTV to questions about purchasing at $2000 or $3300 CAN ($1500 or $2500 US) were not extremely high. Specifically, this percentage varied from 34% for unrestricted access to material with the TV costing $2000 CAN ($1500 US), to 22% for unrestricted access to material with the TV costing $3300 CAN ($2500 US), to 10% when viewing was restricted to VCR cassettes and the total price for TV and VCR was $4000 CAN ($3000 US). It should be noted that, lacking clear knowledge of how samples relate to the overall population and of how expressed purchase interest relates to actual purchase behaviour, expressions of purchase interest are better taken as indices of appreciation than of market penetration. However, the results clearly indicate that the cost of equipment needed for HDTV reception will have a large impact on initial market penetration.

4.3 The Role of TV Attributes

In a second analysis, an attempt was made to determine the extent to which perceived differences in attributes (e.g., colour, sharpness, etc.) of the two TV systems account for the responses to the preference and purchase interest questions. For discussion purposes, the preference questions are defined to be all questions relating to perceived quality, to estimated cost, and to purchase interest where no price is specified. Purchase interest questions refer to those questions where a price is specified and the viewer is asked to rate likelihood of future purchase.

In accounting for ratings on preference questions, three attributes seemed to be most important: colour quality, sense of depth, and image sharpness. Of less importance were the attributes of motion quality, size, and shape. Apparently, responses to preference questions are based on the visual attributes on which HDTV has its largest advantage.

The analysis of responses to the purchase-interest questions [questions where a price of $2000 CAN or more ($1500 US or more) was presented] showed a much different pattern. Here, the two most important attributes were appropriateness of size and motion quality, the two attributes on which HDTV was rated least positively. Apparently, although most viewers were pleased with the visual attributes of HDTV, only the viewers who were happy also with the size and motion quality would consider purchasing at these price levels. Specifically, viewers who did not like the nature of the motion on HDTV (due either to the temporal processing in HDTV or to viewing the larger HDTV at an unusually close distance) or viewers who felt the size of the HDTV set was inappropriate (either in image size or in set volume) seemed unwilling to spend this amount of money regardless of how much they liked the visual attributes.

4.4 Implications for Consumer Behaviour

As just discussed, rated likelihood of purchase tends to be related most strongly to viewer preference ratings for size and motion quality. Additional analyses were undertaken to determine:

a) how purchase interest might vary as a function of introduction scenarios, and
b) if there is any basis on which initial adopters of HDTV could be identified.

Two introduction scenarios were described. In the first, viewers were told that HDTV pictures would only be available on VCR cassettes and that a viewer would have to buy an HDTV TV set and a VCR (projected total cost of $4000 CAN or $3000 US). In the second scenario, HDTV pictures would be available both on VCR cassettes and on pay movie channels. As such, in addition to purchasing the HDTV set (projected cost of $2000 CAN or $1500 US), the viewer either would need to buy a VCR (projected cost $2000 CAN or $1500 US) or to subscribe to a pay movie channel (projected cost of $25+ per month).

In general, purchase interest ratings were lower for these two scenarios than for questions where no restrictions on reception were suggested. Thus, the availability of signals will be an important issue in initial market penetration for HDTV. Interestingly, however, individuals who already subscribed to a pay movie channel did not mind the restriction in the second scenario. That is, their purchase interest ratings in Scenario 2 were equal to their purchase interest ratings under a "no restriction" scenario. If an advanced TV system were to be introduced with this particular restriction (i.e., material only available from VCR cassettes and pay movie channels), current pay movie subscribers would appear to represent a potential target group.

In an attempt to gain further information about initial adopters, the demographic characteristics of respondents were used to try to predict responses to the purchase interest questions. While the relationships here were not strong, a number of conclusions were suggested:

1) the strongest predictor of expressed purchase interest for HDTV was ownership of a compact disc player;
2) several other demographic variables also correlated with expressed purchase interest, specifically:
   a) the number of video devices owned correlated

positively with purchase interest (especially when the number of televisions already owned was factored out); and

b) employment in a television-related industry, age, and educational level correlated negatively with purchase interest.

The picture that emerges here is that the first wave of advanced television purchasers may be those who are already oriented toward purchasing new and high quality entertainment technology and services (compact disc player owners, owners of video devices like video games players and VCRs, and pay movie subscribers).

5. IMPLICATIONS FOR ADVANCED TELEVISION

The results of the survey demonstrate clearly that viewers prefer high definition to conventional television. This preference was expressed in direct and indirect comparisons of HDTV and NTSC in judgements of quality, in estimates of the costs of TV sets, and in expressions of interest in purchasing TV equipment and services under various scenarios of price and availability. Furthermore, this preference was exhibited despite the fact that HDTV was exemplified in distribution-level quality while NTSC was exemplified in virtually studio-level quality.

5.1 Demand for Advanced Television

The results suggest that, subject to factors to be discussed later, there is interest and demand for advanced television. It is clear from the results that the public recognizes and appreciates the differences between advanced TV (as exemplified by HDTV) and conventional TV (as exemplified by high quality NTSC).

Recognition of the differences is evident in the strong preferences for the advanced system on such factors as picture quality, picture sharpness, colour quality, depth portrayal, and picture shape (aspect ratio). Appreciation of the differences is evident in the superiority of the advanced system on indices such as estimated cost (value) of TV sets and expressed purchase interest for TV equipment and services under various price and introduction scenarios.

5.2 Factors Affecting Expressed Demand

Aside from demographic factors, the results of the survey identify three major factors that affect expressed demand. These are: the cost of the TV equipment needed, the availability of signals in the appropriate format, and the quality of reception.

5.2.1 Cost of Equipment

The results suggest that large-scale initial adoption of advanced television is unlikely if prices for advanced television equipment are greatly in excess of those for high quality conventional equipment. It is clear from the results that relatively few viewers anticipate that advanced TV equipment will cost a great deal more than high quality conventional equipment and that expressed purchase interest diminishes noticeably as prices increase.

As was stated previously, an advanced TV set was estimated to cost, on average, about $300-$400 (CAN or US) more than a high-quality conventional set. Estimates of increases greater than $900 (CAN or US) were relatively rare (less than 25% of respondents in most sites). Further, expressed purchase interest decreased sharply in most sites from about 74% of viewers "if sets are in your price range" to 34% and 22% of viewers if sets were to cost $2000 CAN ($1500 US) and $3300 CAN ($2500 US), respectively. However, these exact figures should be interpreted with caution in the absence of clear knowledge of how well the viewer samples relate to the overall population and of how purchase interest relates to purchase behaviour.

5.2.2 Availability of Signals

The results of the survey suggest that large-scale initial adoption of advanced TV also is unlikely if the availability of signals in the appropriate format is severely curtailed. It is clear from the results that expressed purchase interest drops as availability becomes increasingly constrained.

As was stated previously, expressed purchase interest at $2000 CAN ($1500 US) decreased from 34% of viewers in most sites

with no restrictions on access to 26% and 10% if signals were to be available through pay-TV and tape rental and through tape rental, respectively. Again, the exact figures should not be interpreted uncritically, but the pattern of results is clear.

5.2.3 Quality of Reception

The results of the study suggest that large-scale adoption of advanced TV also is unlikely if the quality with which the signal is received is reduced. A tentative observation, this reflects the fact that expressed purchase interest for the advanced system was considerably reduced when a lower quality HDTV source was used.

5.3 Analysis and Conclusions

It is evident from the foregoing discussion that, although there is considerable demand for advanced television, success in introducing an advanced TV system will be highly dependent on factors such as cost of equipment, availability of program material, and quality of reception. At first glance, the importance of these factors might appear to support the introduction of a system that offers improvements over conventional television, but does so in a fashion that sharply curtails the increment in cost and permits ready access to signals (e.g., a slightly higher quality system that is compatible with existing systems).

However, closer examination of the results of the survey does not encourage this view. Even on measures such as estimated cost and unpriced purchase interest, viewers' reactions were strongly related to judgments of sharpness, colour quality, and depth portrayal, factors difficult to achieve in a low-cost system.

Accordingly, it might appear that an appropriate strategy would be to introduce a somewhat higher-quality, higher-cost system and to accept a somewhat reduced initial adoption. However, again the results are not encouraging. Detailed analysis of viewers' reactions reveals that, when costs are significant (e.g., $2000 CAN or $1500 US), viewers become increasingly demanding, with expressed purchase interest eroded by any factor that promotes dissatisfaction (e.g., motion

quality, set size, colour quality, depth portrayal, etc.). Thus, it is possible that the cost of an intermediate-quality system would provoke consumer requirements out of proportion to the capacities of that system.

In conclusion, the results of the survey indicate that there is a need for careful and thorough consideration of options for advanced television. Although there is considerable demand, it will prove difficult to satisfy consumers with regard to both video/audio quality and factors such as price, availability, and transmission quality. It is clear that the centre of gravity of any advanced TV system to be introduced must be very carefully chosen to ensure an appropriate balance between consumer demand and the technical, business, and cost factors.

Finally, it should be noted that research on reactions to advanced television is far from complete. There is a need for further research to pursue, verify, and make complete the findings summarized in this report. Among the issues in need of study are the effects of program material, screen size, and viewing distance on reactions to advanced TV and the effects of test methodology on the results and applicability of tests of advanced television. It is to be expected that, like the current survey, research in the near future will be hampered by lack of equipment and of program material. However, it is hoped that, with increased availability of both material and equipment, research can be conducted with greater convenience.

6. REFERENCES

1. Hearty, P.J., and Phillips, D.A. (in press). A Survey of Public Response to High-Definition Television. CBC Engineering Review.
2. Conway, F. (in press). North American Public Demonstration of High-Definition Television. CBC Engineering Review.
3. Home Box Office, Inc. (1988). Consumer Response to High Definition Television.
4. Lupker, S.J., Allen, N.J., and Hearty, P.J. (in press). The North American High Definition Television Demonstrations to the Public: Detailed Results of the Survey.